MODEL BTF-75 with Hot Surface Ignition & SmartValve®

COMMERCIAL GAS, GLASS-LINED, TANK-TYPE WATER HEATER

• SAFETY • INSTALLATION • OPERATION • MAINTENANCE • LIMITED WARRANTY

Thank you for buying this energy efficient water heater from A.O. Smith Water Products Company. We appreciate your confidence in our products.

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

— **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

— **WHAT TO DO IF YOU SMELL GAS**

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.**
- **If you cannot reach your gas supplier, call the fire department.**

— **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**

CAUTION

TEXT PRINTED OR OUTLINED IN RED CONTAINS INFORMATION RELATIVE TO YOUR SAFETY. PLEASE READ THOROUGHLY BEFORE INSTALLING AND USING THIS APPLIANCE.

A.O. SMITH
WATER PRODUCTS COMPANY

A DIVISION OF A.O. SMITH CORPORATION
McBee, South Carolina U.S.A.
Stratford, Ontario Canada
www.hotwater.com

® SmartValve is a Registered Trademark of Honeywell Inc.

KEEP THIS MANUAL IN THE POCKET ON THE HEATER FOR FUTURE REFERENCE WHENEVER MAINTENANCE ADJUSTMENT OR SERVICE IS REQUIRED.

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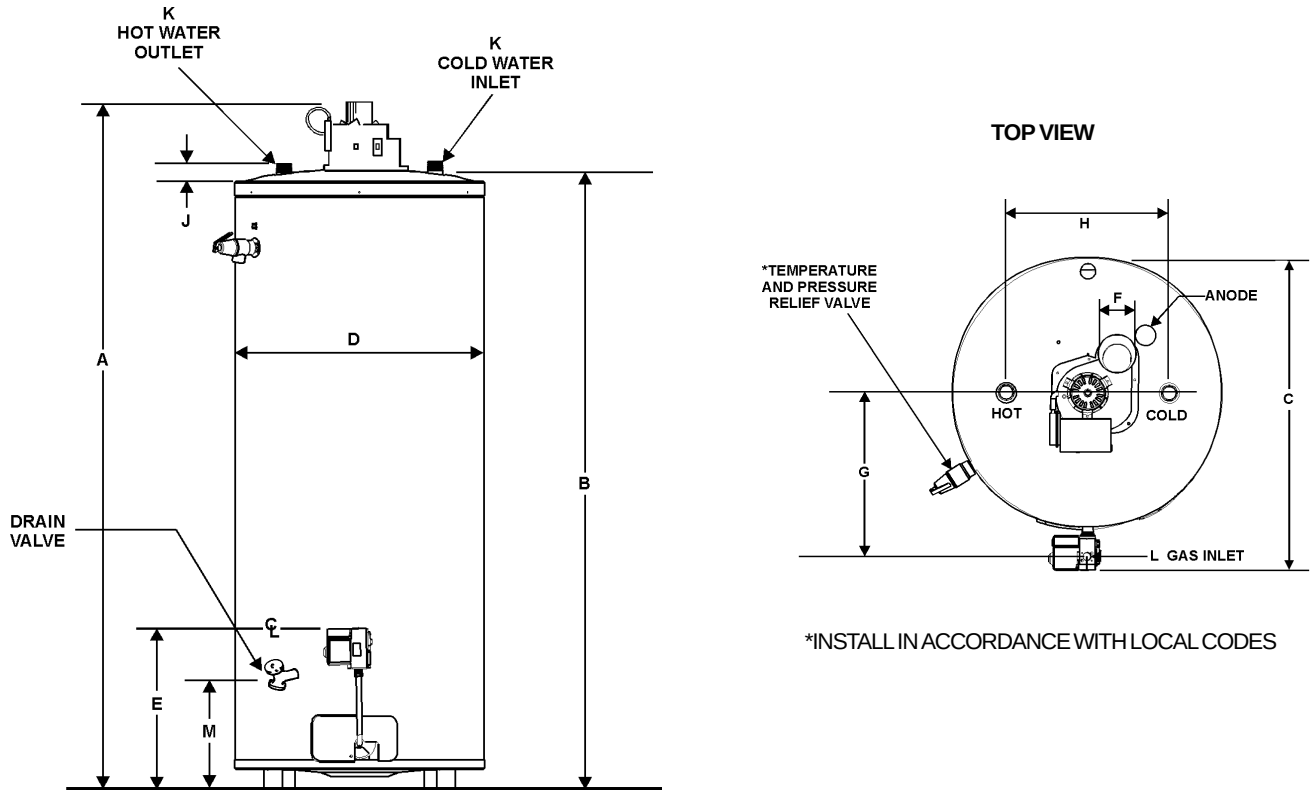
ROUGH-IN-DIMENSIONS



*INSTALL IN ACCORDANCE WITH LOCAL CODES

FIGURE 1

ALL DIMENSIONS IN INCHES

Model	Units	A	B	C	D	E	F	G	H	J	K	L	M
BTF-75	Inches	66 5/16	58 1/2	29 5/8	25 3/8	15 3/16	4	14	16	1 1/4	1	1/2	11 15/16
	cm	168.4	148.6	75.2	64.5	38.6	10.2	35.6	40.6	3.2	NPT	NPT	30.3

RECOVERY CAPACITIES

Model	Input		Approx.	Approx.	Temp. °C	17	22	28	33	39	44	50	56	61	67	72	78
	Rating	Rating	Gal.	Liter													
	Btu/Hr	KW/Hr	Cap.	Cap.	Rise ° F	30	40	50	60	70	80	90	100	110	120	130	140
BTF-75	80,000	23.4	74	284	LPH	979	734	587	489	419	367	326	294	267	245	226	210
					GPH	259	194	155	129	111	97	86	78	71	65	60	55

Recovery capacity based on 80% thermal efficiency.

FOREWORD

The design of model BTF-75 complies with the latest version of ANSI Z21.10.3/CSA 4.3 M98 as automatic storage or automatic circulating tank type water heaters.

Installation diagrams are found in this manual. These diagrams will serve to provide the installer with a reference for the materials and method of piping necessary. It is highly essential that all water and gas piping be installed as shown on the diagrams.

In addition to these instructions, the equipment shall be installed in accordance with those installation regulations in force in the local area where the installation is to be made. These shall be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

The installation must conform to these instructions and the local code authority having jurisdiction. In the absence of local codes, the installation must comply with the latest editions of the National Fuel Gas Code, ANSI Z223.1/NFPA 54. The NFPA. This is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131, or the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

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GENERAL SAFETY INFORMATION

PRECAUTIONS

DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDER WATER. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

IF THE UNIT IS EXPOSED TO THE FOLLOWING, DO NOT OPERATE HEATER UNTIL ALL CORRECTIVE STEPS HAVE BEEN MADE BY A QUALIFIED SERVICEMAN.

1. EXTERNAL FIRE.
2. DAMAGE.
3. FIRING WITHOUT WATER.
4. SOOTING.

CHEMICAL VAPOR CORROSION

WARNING

CORROSION OF THE FLUEWAYS AND VENT SYSTEM MAY OCCUR IF AIR FOR COMBUSTION CONTAINS CERTAIN CHEMICAL VAPORS. SUCH CORROSION MAY RESULT IN FAILURE AND RISK OF ASPHYXIATION.

Spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride (water softener salt), waxes, and process chemicals are typical compounds which are potentially corrosive.

Do not store products of this sort near the heater. Also, air which is brought in contact with the heater should not contain any of these chemicals. If necessary, uncontaminated air should be obtained from remote or outside sources. The limited warranty is voided when failure of water heater is due to a corrosive atmosphere. (Refer to the limited warranty for complete terms and conditions).

IMPROPER COMBUSTION

WARNING

ATTIC AND/OR EXHAUST FANS OPERATING ON THE PREMISES WITH A WATER HEATER CAN RESULT IN CARBON MONOXIDE POISONING AND DEATH.

OPERATION OF THESE FANS CAN PRODUCE A NEGATIVE DRAFT IN THE AREA OF THE WATER HEATER PREVENTING THE PRODUCTS OF COMBUSTION FROM EXHAUSTING THROUGH THE VENT PIPE.

The venting of the water heater should be inspected by a qualified service technician at the time of installation and periodically thereafter to ensure a down-draft condition does not exist.

DO NOT OBSTRUCT THE FLOW OF COMBUSTION AND VENTILATING AIR. ADEQUATE AIR FOR COMBUSTION AND VENTILATION MUST BE PROVIDED FOR SAFE OPERATION.

LIQUID PETROLEUM MODELS

WARNING

Water heaters for propane or liquefied petroleum gas (LPG) are different from natural gas models. A natural gas heater will not function safely on LP gas and no attempt should be made to convert a heater from natural gas to LP gas.

LP gas must be used with great caution. It is highly explosive and heavier than air. It collects first in the low areas making its odor difficult to detect at nose level. If LP gas is present or even suspected, do not attempt to find the cause yourself. Go to a neighbor's house, leaving your doors open to ventilate the house, then call your gas supplier or service agent. Keep area clear until a service call has been made.

At times you may not be able to smell an LP gas leak. One cause is odor fade, which is a loss of the chemical odorant that gives LP gas its distinctive smell. Another cause can be your physical condition, such as having a cold or a diminishing sense of smell with age. For these reasons, the use of a propane gas detector is recommended.

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IF YOU EXPERIENCE AN OUT-OF-GAS SITUATION, DO NOT TRY TO RELIGHT APPLIANCES YOURSELF. Ask your LP delivery person to relight pilots for you. Only trained LP professionals should conduct the required safety checks in accordance with industry standards.

EXTENDED NON-USE PERIODS

WARNING

HYDROGEN GAS CAN BE PRODUCED IN A HOT WATER SYSTEM SERVED BY THIS HEATER THAT HAS NOT BEEN USED FOR A LONG PERIOD OF TIME (GENERALLY TWO WEEKS OR MORE). HYDROGEN GAS IS EXTREMELY FLAMMABLE. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. THERE SHOULD BE NO SMOKING OR OPEN FLAME NEAR THE FAUCET AT THE TIME IT IS OPEN.

INSULATION BLANKETS

Insulation blankets available to the general public for external use on gas water heaters are not necessary with A.O. Smith products. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. Your A.O. Smith water heater meets and exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.

WARNING

Should you choose to apply an insulation blanket to this heater, you should follow these instructions. Failure to follow these instructions can restrict the air flow required for proper combustion, potentially resulting in fire, asphyxiation, serious personal injury or death.

- Do not cover the gas valve or temperature & pressure relief valve.
- Do not allow insulation to come within 2" of the air inlet box, to prevent blockage of the dilution air.
- Do not allow insulation to come within 2" of the floor to prevent blockage of combustion air flow to the burner.
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels from A.O. Smith for placement on the blanket directly over the existing labels.
- Do inspect the insulation blanket frequently to make certain it does not sag, thereby obstructing combustion air flow.

CIRCULATING PUMP

A circulating pump is used when a system requires a circulating loop or there is a storage tank used in conjunction with the heater. Refer to the piping diagrams at rear of manual for electrical hookup information and install in accordance with the latest version of the National Electric Code ANSI/NFPA No. 70.

Only all bronze circulators are used with commercial water heaters.

Although circulators are oiled and operated by the manufacturer some circulators must be oiled again before operating. Please refer to manufacturer's instructions.

DISHWASHING MACHINE REQUIREMENT

These appliances meet the National Sanitation Foundation Standard for sanitary installations when used with the following leg kits, Part No's. 6570-0 and 6570-7.

All dishwashing machines meeting the National Sanitation Foundation requirements are designed to operate with water flow pressures between 15 and 25 psi (103Kpa and 173 Kpa). Flow pressures above 25 psi (173Kpa), or below 15 psi (103 Kpa), will result in improperly sanitized dishes. Where pressures are high, a water pressure reducing or flow regulating control valve should be used in 180^{0}F line to the dishwashing machine, and should be adjusted to deliver water between these limits.

The National Sanitation Foundation also recommends circulation of 180^{0}F (82°C) water. Where this is done, the circulation should be very gentle so that it does not cause any unnecessary turbulence inside the water heater. The circulation should be just enough to provide 180^{0}F (82°C) water at the point of take-off to the dishwashing machine. Adjust flow by means of the plug cock in the circulating line.

INSTALLATION

REQUIRED ABILITY

INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, ELECTRICAL AIR SUPPLY, VENTING AND GAS SUPPLY ARE REQUIRED.

GENERAL

The heater is designed to operate on natural or propane gases. HOWEVER, MAKE SURE the gas on which the heater will operate is the same as that specified on the heater model and rating plate. The installation must conform to these instructions and the local code authority having jurisdiction. In the absence of local codes, conform to the latest edition of National Fuel Gas Code ANSI Z223.1/NFPA 54 and the National Electric Code, NFPA 70. The former is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131, and both documents are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

GROUNDING

The water heater, when installed, must be grounded in accordance with local codes, or in the absence of local codes: The National Electric Code, ANSI/NFPA 70;

HIGH ALTITUDE INSTALLATION

CAUTION

INSTALLATIONS ABOVE 2000 FT. REQUIRE REPLACEMENT OF THE BURNER ORIFICE IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE (ANSI Z223.1/NFPA 54). FAILURE TO REPLACE THE ORIFICE COULD RESULT IN IMPROPER AND INEFFICIENT OPERATION OF THE APPLIANCE, PRODUCING CARBON MONOXIDE GAS IN EXCESS OF SAFE LIMITS, WHICH COULD RESULT IN SERIOUS PERSONAL INJURY OR DEATH. CONTACT YOUR GAS SUPPLIER FOR ANY SPECIFIC CHANGES WHICH MAY BE REQUIRED IN YOUR AREA.

A.O. SMITH BUILDS SOME MODELS SPECIFICALLY FOR HIGH ALTITUDE SERVICE.

PLEASE CHECK THE RATING PLATE BEFORE MAKING CHANGES.

LOCATION OF HEATER

When installing the heater, consideration must be given to proper location. Location selected should be as close to the wall as practicable with adequate air supply and as centralized with the water piping system as possible.

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The heater is design certified by the Canadian Standards for installation on combustible flooring in a closet having minimum clearances from combustible material of: 2" clearance from sides and rear, 6" from the front and 24" from the top. (Standard clearance.) If clearances stated on the heater differ from standard clearances, install water heater according to clearances stated on heater.

A minimum clearance of 4" must be allowed for access to replaceable parts such as the thermostats, drain valve and relief valve. A top clearance of 24" should be allowed for blower assembly service.

Adequate clearance for servicing this appliance should be considered before installation, such as changing the anodes, etc. Minimum clearances for proper operation are given above.

⚠ WARNING

In cold climates provide protection against freeze-up.

THE HEATER SHOULD BE LOCATED IN AN AREA WHERE LEAKAGE OF THE TANK OR CONNECTIONS WILL NOT RESULT IN DAMAGE TO THE AREA ADJACENT TO THE HEATER OR TO LOWER FLOORS OF THE STRUCTURE. When such locations cannot be avoided, a suitable drain pan should be installed under the heater, see fig. 1. The pan must not restrict combustion air flow. Such pans should have a minimum length and width of at least 2 inches greater than the diameter of the heater and should be piped to an adequate drain. Drain pans suitable for these heaters are available from your dealer or A. O. Smith Water Products Company, 5621 W. 115th Street, Alsip, Illinois 60803.

⚠ WARNING

DO NOT INSTALL THIS WATER HEATER DIRECTLY ON A CARPETED FLOOR. A FIRE HAZARD MAY RESULT. Instead the water heater must be placed on a metal or wood panel extending beyond the full width and depth by at least 3 inches (76.2mm) in any direction. If the heater is installed in a carpeted alcove or closet, the entire floor shall be covered by the panel.

AIR REQUIREMENTS

In calculating the free area of a vent opening, the blocking effect of screens, louvers and grills should be considered. Screens shall not be of a mesh smaller than 1/4 inch square. If the free area is not known, the latest edition of National Fuel Gas Code ANSI Z223.1 recommends using figures of 20-25 percent free area for wood louvers or 60-75 percent for metal grills or louvers.

UNCONFINED SPACE

In buildings of conventional frame, brick or stone construction, unconfined spaces may provide adequate air for combustion, ventilation, and dilution air for power venter.

If the unconfined space is within a building of tight construction (building using the following construction: weather stripping, heavy insulation, caulking, vapor barrier, etc.), air for combustion, ventilation, and venter dilution must be obtained from outdoors. The installation instructions for confined spaces must be followed.

CONFINED SPACE

When drawing combustion and dilution air from inside a conventionally constructed building to a confined space, such a space shall be provided with two permanent openings. ONE WITHIN 12 INCHES OF THE ENCLOSURE TOP AND ONE WITHIN 12 INCHES OF THE ENCLOSURE BOTTOM. Each opening shall have a free area of one square inch per 1000 Btuh of the total input of all appliances in the enclosure, but not less than 100 square inches.

If the confined space is within a building of tight construction, air for combustion, ventilation and power venter dilution must be obtained from outdoors. When directly communicating with the outdoors or communicating through vertical ducts, two permanent openings, located in the above manner, shall be provided. Each opening shall have a free area of not less than one square inch per 4000 Btuh of the total input of all appliances in the enclosure. If horizontal ducts are used, each opening shall have a free area of not less than one square inch per 2000 Btuh of the total input of all appliances in the enclosure.

⚠ DANGER

⚠ Vapors from flammable liquids may explode and catch fire causing death or severe burns.

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

Keep flammable products:

1. **far away from heater,**
2. **in approved containers,**
3. **tightly closed and**
4. **out of children's reach.**

Water heater has a main burner and hot surface igniter. The hot surface igniter:

1. **can come on at any time and**
2. **will ignite flammable vapors.**

Vapors:

1. **cannot be seen,**
2. **are heavier than air,**
3. **go a long way on the floor and**
4. **can be carried from other rooms to the pilot flame by air currents.**

Installation:
Do not install water heater where flammable products will be stored or used unless the main burner and pilot flames are at least 18" above the floor. This will reduce, but not eliminate, the risk of vapors being ignited by the main burner or pilot flame.

WATER CONNECTIONS

Refer to figure 12 for typical installation. A suitable pipe thread sealant must be used to prevent leakage.

WATER (POTABLE) HEATING AND SPACE HEATING

1. All piping components connected to this unit for space heating applications shall be suitable for use with potable water.
2. Toxic chemicals, such as those used for boiler treatment, shall NEVER be introduced into this system.
3. This unit may NEVER be connected to any existing heating system or component(s) previously used with a non-potable water heating appliance.
4. When the system requires water for space heating at temperatures higher than required for domestic water purposes, a tempering valve must be installed. Please refer to Fig. 2 for suggested piping arrangement.

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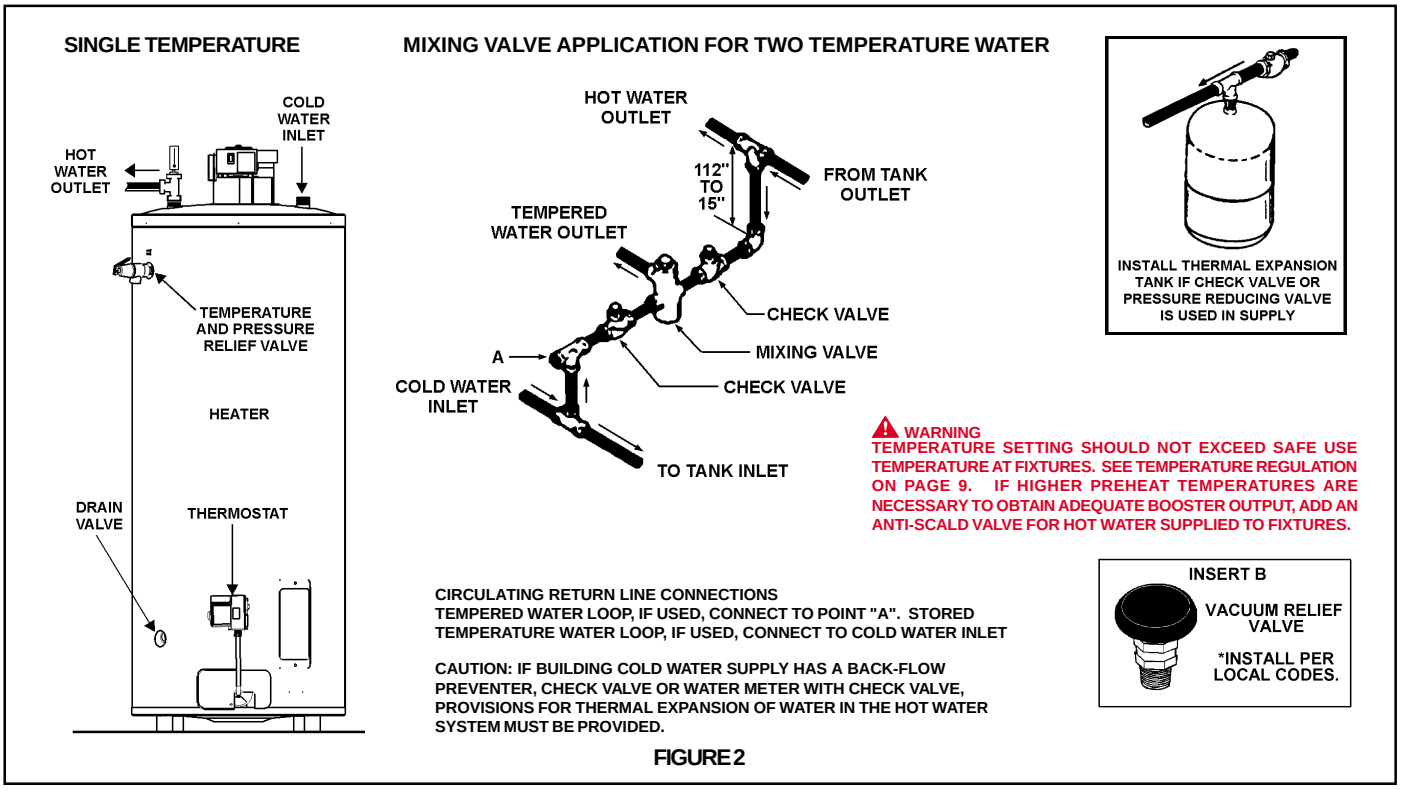
SINGLE TEMPERATURE
COLD WATER INLET
HOT WATER OUTLET
TEMPERATURE AND PRESSURE RELIEF VALVE
HEATER
DRAIN VALVE
THERMOSTAT
MIXING VALVE APPLICATION FOR TWO TEMPERATURE WATER
HOT WATER OUTLET
112" TO 15"
FROM TANK OUTLET
TEMPERED WATER OUTLET
CHECK VALVE
MIXING VALVE
A
CHECK VALVE
COLD WATER INLET
TO TANK INLET
INSTALL THERMAL EXPANSION TANK IF CHECK VALVE OR PRESSURE REDUCING VALVE IS USED IN SUPPLY
WARNING
TEMPERATURE SETTING SHOULD NOT EXCEED SAFE USE TEMPERATURE AT FIXTURES. SEE TEMPERATURE REGULATION ON PAGE 9. IF HIGHER PREHEAT TEMPERATURES ARE NECESSARY TO OBTAIN ADEQUATE BOOSTER OUTPUT, ADD AN ANTI-SCALD VALVE FOR HOT WATER SUPPLIED TO FIXTURES.
CIRCULATING RETURN LINE CONNECTIONS
TEMPERED WATER LOOP, IF USED, CONNECT TO POINT "A". STORED TEMPERATURE WATER LOOP, IF USED, CONNECT TO COLD WATER INLET
CAUTION: IF BUILDING COLD WATER SUPPLY HAS A BACK-FLOW PREVENTER, CHECK VALVE OR WATER METER WITH CHECK VALVE, PROVISIONS FOR THERMAL EXPANSION OF WATER IN THE HOT WATER SYSTEM MUST BE PROVIDED.
INSERT B
VACUUM RELIEF VALVE
*INSTALL PER LOCAL CODES.

FIGURE 2

CLOSED WATER SYSTEM

A closed system will exist if a back-flow preventer (check valve), pressure reducing valve, or other similar device is installed in the cold water line between the water heater and the street main (or well). Excessive pressure may develop due to the thermal expansion of heated water causing premature tank failure or intermittent relief valve operation. This type of failure is not covered by the limited warranty. An expansion tank may be necessary in the cold water supply to alleviate this situation. Contact the local plumbing authority.

If the temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct situation. DO NOT PLUG THE TEMPERATURE AND PRESSURE RELIEF VALVE.

RELIEF VALVE

A NEW TEMPERATURE AND PRESSURE RELIEF VALVE COMPLYING WITH THE STANDARD FOR RELIEF VALVES AND AUTOMATIC GAS SHUT OFF DEVICES FOR HOT WATER SUPPLY SYSTEMS, ANSI Z21.22 (LATEST EDITION) MUST BE INSTALLED IN THE HEATER IN THE MARKED OPENING PROVIDED. THE VALVE MUST BE OF A SIZE (INPUT RATING) THAT WILL BE ADEQUATE FOR YOUR SIZE HEATER.

Check the metal tag on the relief valve and compare it to the heater's rating plate. The pressure rating of relief valve must not exceed the working pressure shown on the rating plate of the heater. In addition the hourly Btu rated temperature steam discharge capacity of the relief valve shall not be less than the input rating of the heater. NO VALVE IS TO BE PLACED BETWEEN THE RELIEF VALVE AND TANK. DO NOT PLUG THE RELIEF VALVE.

The drain line connected to this valve must not contain a reducing coupling or other restriction and must terminate near a suitable drain to prevent water damage during valve operation. The discharge line shall be installed in a manner to allow complete drainage of both the valve and line. DO NOT THREAD, PLUG OR CAP THE END OF THE DRAIN LINE.

VENTING

WARNING

THE INSTRUCTIONS IN THIS SECTION ON VENTING MUST BE FOLLOWED TO AVOID CHOKED COMBUSTION OR RECIRCULATION OF FLUE GASES. SUCH CONDITIONS CAUSE SOOTING OR RISKS OF FIRE AND ASPHYXIATION. NEVER OPERATE THE HEATER UNLESS IT IS VENTED TO THE OUTDOORS AND HAS ADEQUATE AIR SUPPLY TO AVOID RISKS OF IMPROPER OPERATION, FIRE, EXPLOSION OR ASPHYXIATION.

VENT PIPE TERMINATION

The first step is to determine where the vent pipe will terminate. The vent may terminate through the roof (see Figure 9) or through a sidewall (see Figure 8).

IMPORTANT

The vent system must terminate so that proper clearances are maintained as cited in local codes or the latest edition of the National Fuel Gas Code, ANSI Z223.1, 7.3.4e and 7.8a, b.

For your convenience instructions on proper installation through a sidewall are provide in Figure 3 and the numbered points below:

1. The exit terminals of a mechanical vent system shall be not less than 7 feet above grade when located adjacent to public walkways.

2. A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet.

3. The venting system shall terminate at least 4 feet below, 4 feet horizontally from or, 1 foot above any door, window or gravity air inlet into any building.

4. The manufacturer also recommends that the vent system termination not be installed closer than 3 feet from an inside corner of an L shaped structure and not be less than 1 foot above grade. The vent shall terminate a minimum of 12" above expected snowfall level to prevent blockage of vent termination.

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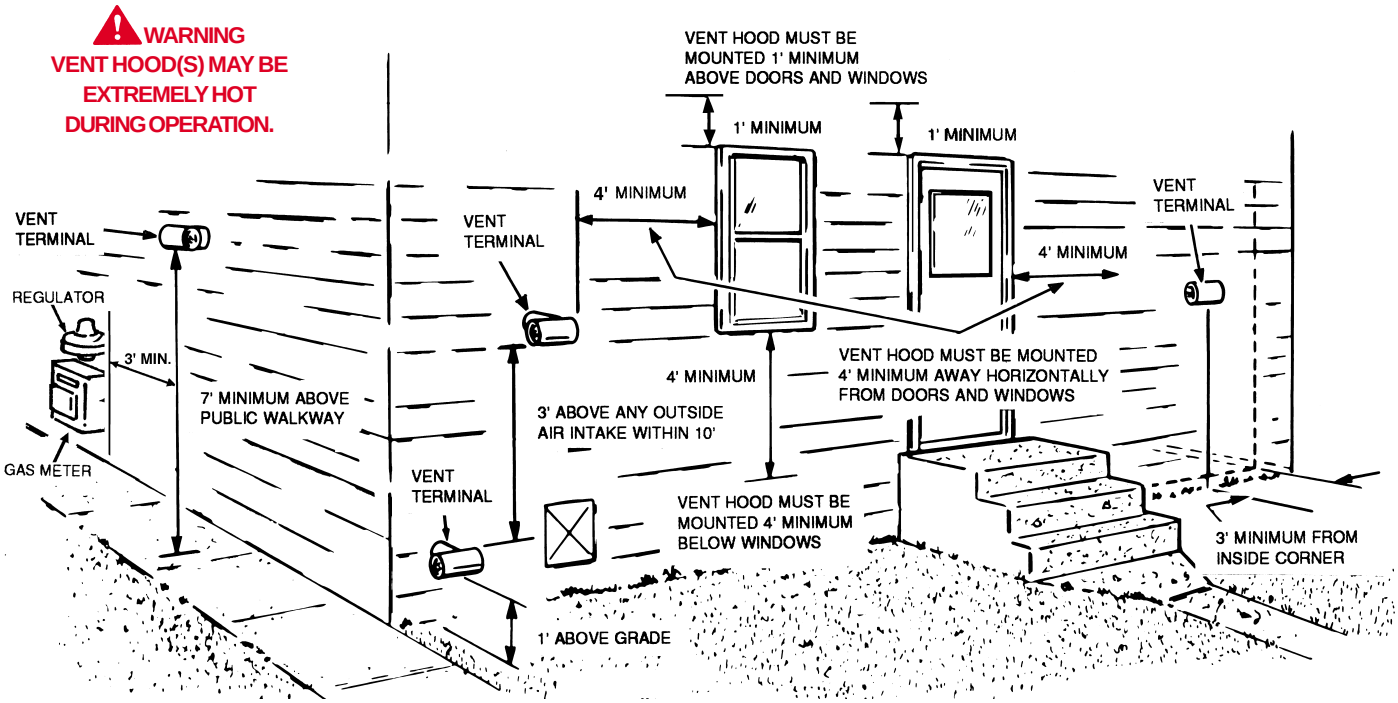

FIGURE 3

5. The vent termination shall not be mounted directly above or within 3 feet horizontally from an oil tank vent or gas meter to avoid potential freeze-up from condensation.

Plan the vent system layout so that proper clearances are maintained from plumbing and wiring.

Vent pipes serving power vented appliances are classified by building codes as "vent connectors". Required clearances from combustible materials must be provided in accordance with information in this manual under LOCATION OF HEATER and VENT TERMINAL INSTALLATIONS, and with the National Fuel Gas Code and local codes.

PLANNING THE VENT SYSTEM

Plan the route of the vent system from the discharge of the blower to the planned location of the vent terminal.

1. Layout the total vent system to use a minimum of vent pipe and elbows. Take into consideration that an elbow will be necessary to make the first vent pipe connection to the power venter outlet (see Figure 6).

2. This water heater is capable of venting the flue gases the equivalent of thirty (30) feet of 3 inch pipe or eighty-five (85) feet of 4 inch pipe as listed in Table 1.

Number of 90° Elbows	3" Maximum Pipe (Feet)	4" Maximum Pipe Feet
ONE (1)	25	80
TWO (2)	20	75
THREE (3)	15	70
FOUR (4)	10	65
FIVE (5)	- - -	60

TABLE 1

NOTE: The equivalent feet of pipe listed above are exclusive of the "Tee" termination. That is, the first elbow and the termination "Tee", with installed screens, are assumed to be in the system and the remainder of the system must not exceed the thirty (30) equivalent feet of 3 inch pipe or eighty five (85) equivalent feet of 4 inch pipe.

3. The blower discharge adapter is made to accept only straight sections of 3" pipe. To start a minimum of 2 inches of 3" pipe must be glued into the blower discharge (See figure 6).

If using 3 inch vent pipe:
A minimum of 2 inches, maximum of 4 feet of 3" pipe must be attached to the blower before the first 3-inch elbow. After the first elbow add the additional venting required for the installation. The total system cannot exceed 30 equivalent feet of venting, where each elbow is equal to 5 feet of straight pipe.

If using 4 inch vent pipe:
Two inches of 3" pipe must be attached to the blower discharge. A 4" x 3" reducer is added and then up to maximum 4 feet of 4 inch pipe added before the first elbow. An additional 4" x 3" reducer and (1) foot of 3" pipe must be added to the end of the vent system before terminating into the 3" tee. The total system cannot exceed 85 equivalent feet of 4" venting, where each elbow is equal to 5 feet of straight pipe.

NOTE: This unit can be vented using only PVC (Class 160, ASTM D-2241; Schedule 40, ASTM D-1785; or Cellular Core Schedule 40 DWV, ASTM F-891), Schedule 40 CPVC/ASTM F-441), or ABS/ASTM D-2661) pipe. The fittings, other than the TERMINATION TEE should be equivalent to PVC-DWV fittings meeting ASTM D-2665 (Use CPVC fittings, ASTM F-438 for CPVC pipe and ABS fittings. ASTM D-2661/3311 for ABS pipe. If CPVC or ABS pipe and fittings are used, then the proper cement must be used for all joints, including joining the pipe to the Termination Tee (PVC Material).

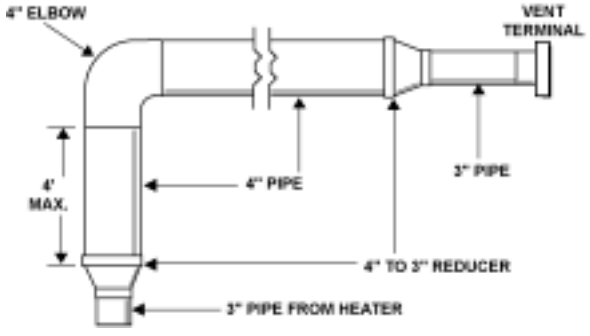

FIGURE 4

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PVC Materials should use ASTM D-2564 Grade Cement; CPVC Materials should use ASTM F-493 Grade Cement and ABS Materials should use ASTM D-2235 Grade Cement.

NOTE: 1. For water heaters in locations with high ambient temperatures (above 100°F) and/or insufficient dilution air, it is recommended that CPVC or ABS pipe and fittings be used. **2.** The SUPPLIED VENT TERMINAL must be used in all cases.

4. The temperature of the flue gases leaving the blower is about 160°F after mixing the dilution air in the inlet adapter of the blower. Even with high concentrate of room air taken into the vent system for dilution air, there will be some installations where condensate will be formed in the horizontal runs of the vent system. This condensate **MUST NOT** be allowed to drain back into the fan unit.

   One method to catch the condensate before it can run back to the fan is to install a "TEE" mounted upside down and capped, just past the first elbow, (Fig.9) of the vent pipe system. This set-up will require the installation of a small (1/4-3/8 inch) plastic tube, with the proper trap, to drain the condensate to a floor drain.

   A second method to prevent the condensate from draining back to the fan unit would be to install the vent system with a slight, 1/8 inch per five foot of pipe maximum, downward slope (max. of 5/8 inch).

INSTALLATION OF SIDEWALL VENT SYSTEM

Before beginning installation of piping system thoroughly read the section of this manual VENT PIPE PREPARATION.

If you are installing your system so that it vents through roof, please refer to following section titled INSTALLATION OF VERTICAL VENT SYSTEM.

VENT TERMINAL INSTALLATION, SIDEWALL

1. Install the vent terminal by using the cover plate as a template to mark the hole for the vent pipe to pass through the wall. BEWARE OF CONCEALED WIRING AND PIPING INSIDE THE WALL.

2. If the Vent Terminal is being installed on the outside of a finished wall, it may be easier to mark both the inside and outside wall. Align the holes by drilling a hole through the center of the template from the inside through to the outside. The template can now be positioned on the outside wall using the drilled hole as a centering point for the template.

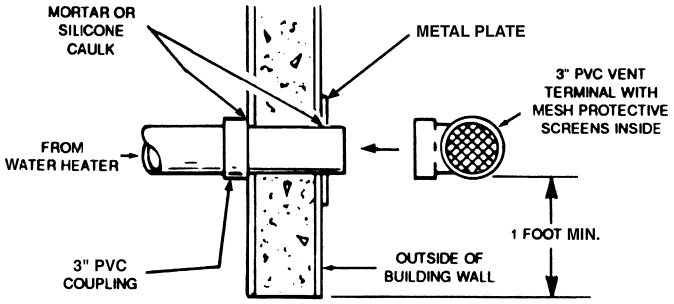
3. A) MASONRY SIDE WALLS
   Chisel an opening approximately one half inch larger than the marked circle.

   B) WOODEN SIDE WALLS
   Drill a pilot hole approximately one quarter inch outside of the marked circle. This pilot hole is used as a starting point for a saws-all or sabre saw blade. Cut around the marked circle staying approximately one quarter inch outside of the line. (This will allow the vent to easily slide through the opening. The resulting gap will be covered up by the Vent Terminal cover plate.) Repeat this step on inside wall if necessary.

SEQUENCE OF INSTALLATIONS, FIGURE 4

Cut a length of 3" PVC pipe about 3.5 inches longer than the wall thickness at the opening. Glue the vent terminal "TEE" with screens to this section of pipe. Slide the wall plate over the pipe to stop against "TEE". Place a bead of caulking (not supplied) around the gap between the pipe and cover plate. Apply enough to fill some of the gap between the pipe and wall. Place some of the caulking on the back of the plate to hold it against the wall after installation. If the vent pipe is installed up to the wall, with a coupling on the end against the wall opening, the pipe with the vent terminal can be prepared for gluing before inserting through the wall.

Slide the pipe through the wall and insert into the coupling on the other side of the wall, making sure that the vent terminal ends up pointed in the correct position. (See fig. 5).


MORTAR OR SILICONE CAULK
METAL PLATE
3" PVC VENT TERMINAL WITH MESH PROTECTIVE SCREENS INSIDE
FROM WATER HEATER
1 FOOT MIN.
3" PVC COUPLING
OUTSIDE OF BUILDING WALL

VENT TERMINATION

FIGURE 5

PREPARATION OF BLOWER ASSEMBLY

1. Check to make sure that the wire harness is attached to the gas valve and blower control box.

2. Make sure no material is still attached to the outside or inside of blower assembly.

3. Make sure that plastic tubing is still attached to the pressure switch and fan housing. Also make sure that wiring connector from motor to control box is securely attached.

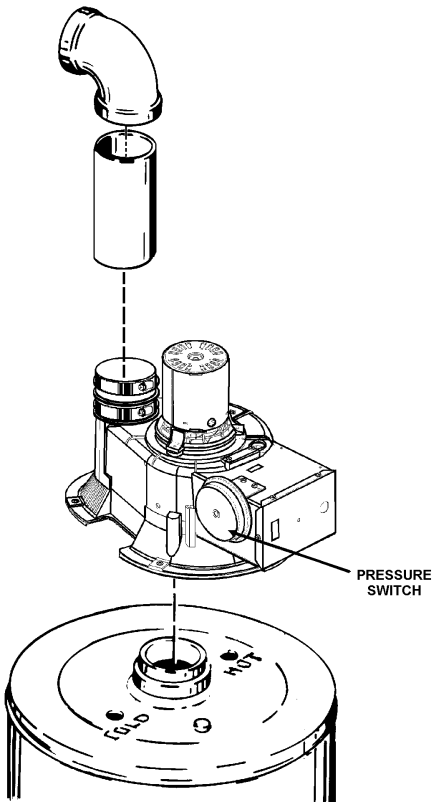


FIGURE 6

4. Do not plug in power cord until vent system is completely installed. The Power Vent operates on 120 Vac, therefore a grounded outlet must be within reach of the 6 foot flexible power cord supplied with the vent (see fig.1). The power cord supplied may be used on unit only where local codes permit. If local codes do not permit use of flexible power supply cord:

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A. Remove two screws that secure side plate on control box and remove plate.

B. Cut flexible power cord on inside of control box, as close to inside wall as possible.

C. If flexible cord and strain relief are removed, then opening in box must be covered.

D. Remove plastic cap in top of control box and install suitable conduit fitting in enclosure.

E. Splice field wiring into existing wiring using code authorized method (wire nuts, etc).

F. Be certain that neutral and line connections are not reversed when making these connections. (See Figure 7).

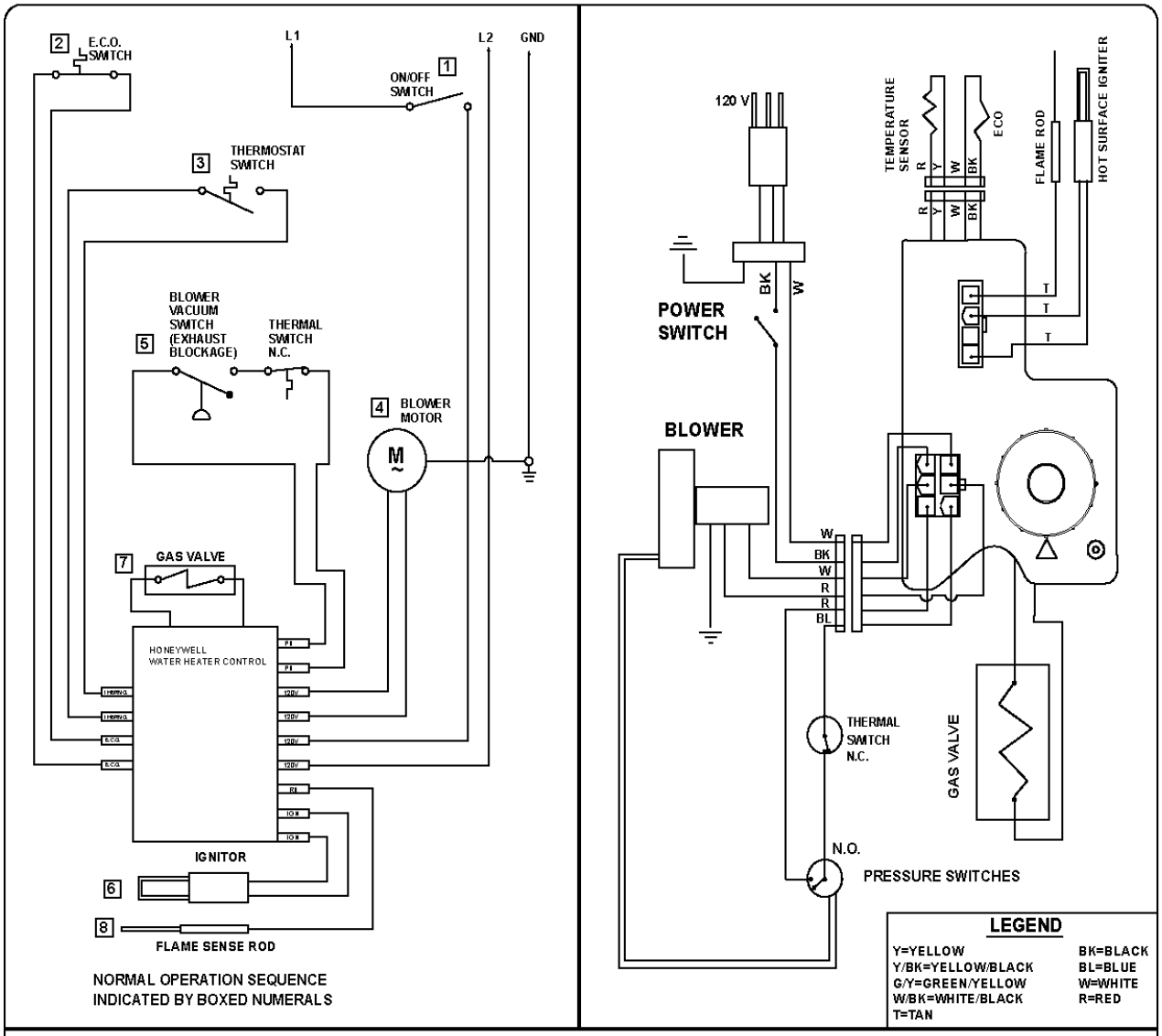
G. Replace side panel and secure with two screws.

5. The blower discharge adapter is made to accept only straight sections of 3" pipe. To start off with an elbow, a short section of the furnished pipe, a minimum of 2 inches, must be cut and glued into the end of the elbow that will mount on the discharge adapter (see fig. 6).

6. An 1/8 inch bead of high temperature silicone should be applied to the circumference of the discharge adapter just before installing the first section of pipe or elbow.

CAUTION

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.



WARNING

DISCONNECT FROM ELECTRICAL SUPPLY BEFORE SERVICING UNIT.
REPLACE ALL DOORS AND PANELS BEFORE OPERATING HEATER.

IF ANY OF THE ORIGINAL WIRES SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH APPLIANCE WIRE MATERIAL WITH MINIMUM TEMPERATURE RATING OF 105°C AND A MINIMUM SIZE OF NO. 18 AWG.

POWER VENT WIRING SCHEMATIC - FIGURE 7

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INSTALLATION OF VENT SYSTEM, SIDEWALL

With the route of the venting system and selection of materials completed, as discussed in section of this manual titled PLANNING THE VENT SYSTEM, the through the wall vent terminal in place and the first section of piping, up to first elbow, installed at the blower it is time to complete the installation of the venting system for the sidewall installation.

Before completing the installation of the venting system be sure to read the sections of this manual discussing the proper method of cutting and cementing PVC pipe and fittings: VENT PIPE PREPARATION.

It is recommended that the completion of the venting system start at the blower assembly and run to the coupling on the inside wall of the vent terminal, Figure 5.

The vent system piping should be supported every 5 feet of vertical run and every 3 feet of horizontal run. All piping and fittings must be joined by the proper procedures as described under: VENT PIPE PREPARATION.

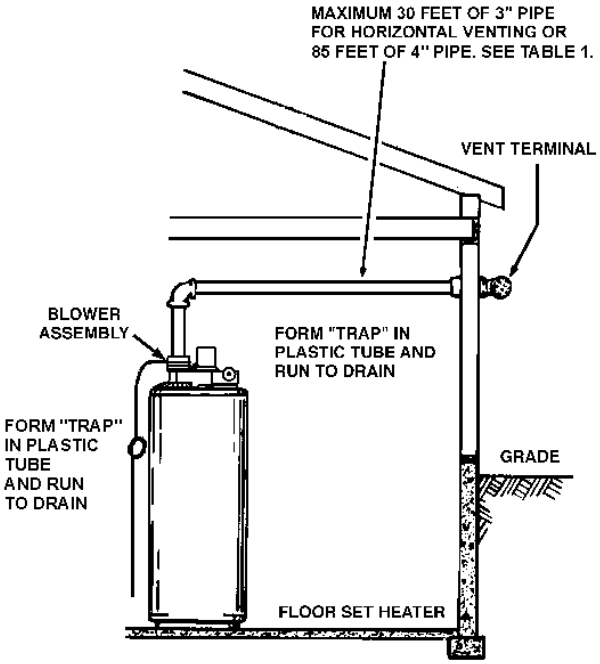

FIGURE 8

INSTALLATION OF VERTICAL VENT SYSTEM

This unit is approved for venting through the roof with only the vent terminal that is included with the unit, see Figure 9. A proper flashing or "BOOT" should be used to seal the pipe where it exits the roof. The total vent system should not exceed the thirty (30) equivalent feet of 3 inch pipe or sixty (60) equivalent feet of 4 inch pipe as listed in Table 1.

NOTE: The equivalent feet of pipe listed above are exclusive of the "TEE" termination with installed screens.

Provide support for all pipe protruding through the roof. All piping should be properly secured. The vent system piping should be supported every 5 feet of vertical run and every 3 feet of horizontal run. All piping and fittings must be joined by the proper procedures as described under: VENT PIPE PREPARATION.

IMPORTANT

The vent system must terminate so that proper clearances are maintained as cited in local codes or the latest edition of the National Fuel Gas Code, ANSI Z223.1 and as listed below:

1. Vent Termination must extend a minimum of 12 inches above roof or 12 inches above the anticipated snow level to prevent blockage of the vent termination.

2. The venting system shall terminate at least four (4) feet from or one (1) foot above any gable, dormer or other roof structure with building interior access; i.e., vent, window, etc.

3. The venting system shall terminate three (3) feet above any forced air inlet located within ten feet.

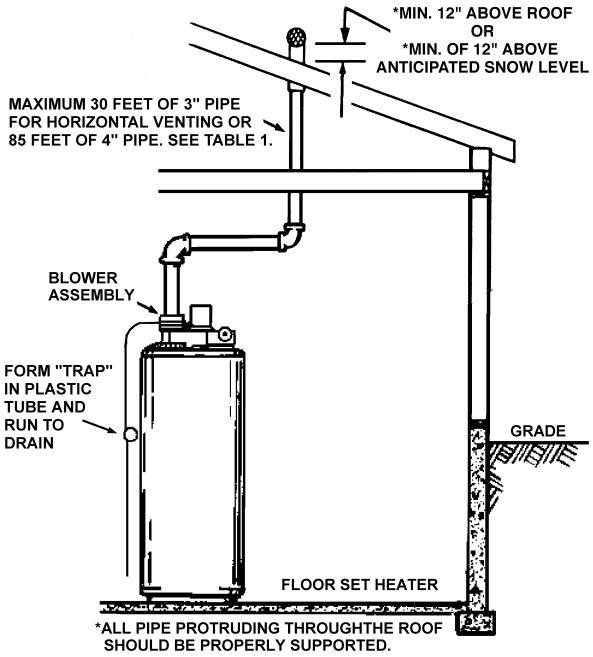

FIGURE 9

VENT PIPE PREPARATION

1. **INITIAL PREPARATION**

   A. Make sure the solvent cement you are planning to use is designed for the specific application you are attempting.

   B. Know the physical and chemical characteristics and limitations of the PVC and CPVC piping materials that you are about to use.

   C. Know the reputation of your manufacturer and their products.

   D. Know your own qualifications or those of your contractor. The solvent welding technique of joining PVC and CPVC pipe is a specialized skill just as any other pipe fitting technique.

   E. Closely supervise the installation and inspect the finished job before start-up.

   F. Contact the manufacturer, supplier, or competent consulting agency if you have any questions about the application or installation of PVC and CPVC pipe.

   G. Take the time and effort to do a professional job. Shortcuts will only cause you problems and delays in start-up. By far, the majority of failures in PVC and CPVC systems are the result of shortcuts and/or improper joining techniques.

2. **SELECTION OF MATERIALS**

   - Cutting Device - Saw or Pipe Cutter
   - Deburring Tool, Knife, File, or Beveling Machine (2" and above)
   - Brush - Pure Bristle

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- Rag - Cotton (Not Synthetic)
- Primer and Cleaner
- Solvent Cement - PVC for PVC Components and CPVC for CPVC Components
- Containers - Metal or Glass to hold Primer and Cement. Select the type of PVC or CPVC materials to be used on the basis of their application with respect to chemical resistance, pressure rating, temperature characteristics,etc.
- Insertion Tool - Helpful for larger diameter pipe and fittings (6" and above).

PRIMER

It is recommended that Tetrahydrofuran (THF) be used to prepare the surfaces of pipe and fittings for solvent welding. Do not use water, rags, gasoline or any other substitutes for cleaning PVC or CPVC Surfaces. A chemical cleaner such as MEK may be used.

CEMENT

The cement should be a bodied cement of approximately 500 to 1600 centipoise viscosity containing 10-20% (by weight) virgin PVC material solvated with tetrahydrofuran (THF). Small quantities of dimethyl formamide (DMF) may be included to act as a retarding agent to extend curing time. Select the proper cement; Schedule 40 cement should be used for Schedule 40 pipe. Never use all-purpose cements, commercial glues and adhesives or ABS cement to join PVC or CPVC pipe and fittings.

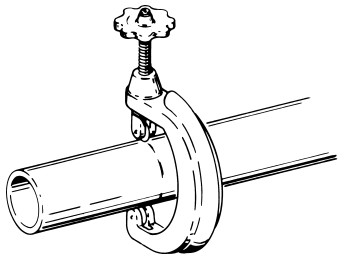
SAFETY PRECAUTION: PRIMERS AND CEMENTS ARE EXTREMELY FLAMMABLE, AND MUST NOT BE STORED OR USED NEAR HEAT OR OPEN FLAME. ALSO, USE ONLY IN A WELL-VENTILATED AREA.

3. **MAKING THE JOINT**

A. Cutting

Pipe must be squarely cut to allow for the proper interfacing of the pipe end and the fitting socket bottom. This can be accomplished with a miter box saw or wheel type cutter. Wheel type cutters are not generally recommended for larger diameters since they tend to flare the corner of the pipe end. If this type of cutter is used, the flare on the end must be completely removed.

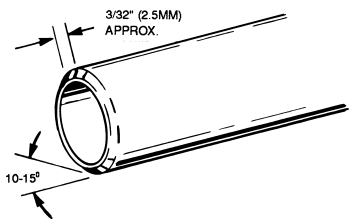
NOTE: Power saws should be specifically designed to cut plastic pipe.



STEP A

B. Deburring

Use a knife, plastic pipe deburring tool, or file to remove burrs from the end of small diameter pipe. Be sure to remove all burrs from around the inside as well as the outside of the pipe. A slight chamfer (bevel) of about 10°-15° should be added to the end to permit easier insertion of the pipe into the end of the fitting. Failure to chamfer the edge of the pipe may remove cement from the fitting socket, causing the joint to leak.



STEP B

C. Test dry fit of the joint

Tapered fitting sockets are designed so that an interference fit should occur when the pipe is inserted about 1/3 to 2/3 of the way into the socket. Occasionally, when pipe fitting dimensions are at the tolerance extremes, it will be possible to fully insert dry pipe to the bottom of the fitting socket. When this happens, a sufficient quantity of cement must be applied to the joint to fill the gap between the pipe and fitting. The gap must be filled to obtain a strong, leak-free joint.

D. **Inspection, cleaning, priming**

Visually inspect the inside of the pipe and fitting sockets and remove all dirt, grease or moisture with a clean dry rag. If wiping fails to clean the surfaces, a chemical cleaner must be used. Check for possible damage such as splits or cracks and replace if necessary.

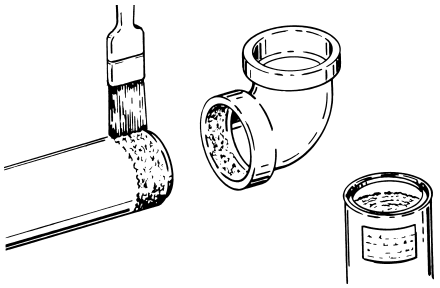
Depth-of-entry mark

Marking the depth of entry is a way to check if the pipe has reached the bottom of the fitting socket in step F. Measure the fitting depth and mark this distance on the pipe O.D. You may want to add several inches to the distance and make a second mark as the primer and cement will most likely destroy your first one.

Apply primer to the surface of the pipe and fitting socket with a natural bristle brush (see chart). This process softens and prepares the PVC or CPVC for the solvent cementing step. Move quickly and without hesitation to the cementing procedure while the surfaces are still wet with primer.

E. Application of solvent cement

- Apply the solvent cement evenly and quickly around the outside of the pipe at a width a little greater than the depth of the fitting socket.
- Apply a light coat of cement evenly around the inside of the fitting socket. Avoid puddling.
- Apply a second coat of cement to the pipe end.

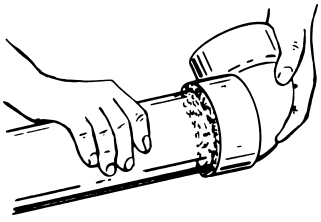


STEP E

NOTE: Cans of cement and primer should be closed at all times when not in use to prevent evaporation of chemicals and hardening of cement. They are also very flammable and should be kept away from heat or flame.

F. Joint assembly

Working quickly, insert the pipe into the fitting socket bottom and give the pipe or fitting a 1/4" turn to evenly distribute the cement. Do not continue to rotate the pipe after it has hit the bottom of the fitting socket. A good joint will have sufficient cement to make a bead all the way around the outside of the fitting hub. The fitting will have a tendency to slide back while the cement is still wet so hold the joint together for about 15 seconds.



STEP F

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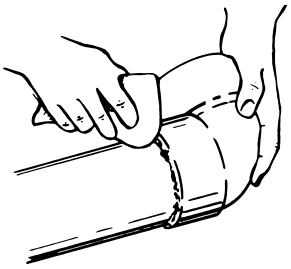
G. Cleanup and joint movement

Remove all excess cement from around the pipe and fitting with a dry cotton rag. This must be done while the cement is still soft.

The joint should not be disturbed immediately after the cementing procedure, and sufficient time should be allowed for proper curing of the joint. Exact drying time is difficult to predict because it depends on variables such as temperature, humidity and cement integrity. For more specific information, you should contact your solvent cement manufacturer.



STEP G

GAS CONNECTIONS

The minimum gas supply pressure for input adjustment is 5.0" W.C. for natural gas (11.0" W.C. for propane).

THE HEATER IS NOT INTENDED FOR OPERATION AT HIGHER THAN 14" WATER COLUMN SUPPLY PRESSURE. EXPOSURE TO HIGHER GAS SUPPLY PRESSURE MAY CAUSE DAMAGE TO THE CONTROL WHICH COULD RESULT IN FIRE OR EXPLOSION. If overpressure has occurred such as through improper testing of gas lines or emergency malfunction of the supply system, the control must be checked for safe operation. Make sure that the outside vents on the supply regulators and the safety vent valves are protected against blockage. These are parts of the gas supply system not the heater. Vent blockage may occur during ice storms.

IT IS IMPORTANT TO GUARD AGAINST CONTROL FOULING FROM CONTAMINANTS IN THE GAS WAYS. SUCH FOULING MAY CAUSE IMPROPER OPERATION, FIRE OR EXPLOSION.

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA-54) whichever applies.

REFER TO FIG. 12 FOR CONNECTION DETAILS. BEFORE ATTACHING THE GAS LINE BE SURE THAT ALL GAS PIPE IS CLEAN ON THE INSIDE.

TO TRAP ANY DIRT OR FOREIGN MATERIAL IN THE GAS SUPPLY LINE, A DIRT LEG (SOMETIMES CALLED DRIP LEG) MUST BE INCORPORATED IN THE PIPING, FIG. 12. The dirt leg must be readily accessible. Install in accordance with recommendations of serving gas supplier. Refer to the latest edition of ANSI Z223.1.

To prevent damage, care must be taken not to apply too much torque when attaching gas supply pipe to thermostat gas inlet. The thermostat inlet has a pad for use with a backup wrench.

Apply joint compounds (pipe dope) sparingly and only to the male threads of pipe joints. Do not apply compound to the first two threads. Use compounds resistant to the action of liquefied petroleum gases. Do not use teflon tape on thermostat fittings.

CONNECTION OF GAS PIPE

1. When connecting gas pipe to unit, apply wrench to flange only. Note: Do not use wrench on gas valve or gas valve bracket.

2. PERFORM THE GAS LEAK TEST ANY TIME WORK IS DONE ON A GAS SYSTEM TO AVOID THE POSSIBILITY OF FIRE OR EXPLOSION WITH PROPERTY DAMAGE PERSONAL INJURY OR LOSS OF LIFE.

   The Gas Leak Test is performed as follows: Paint pipe connections upstream of gas control with a rich soap and water solution to test for leaks before operating main burner. Bubbles indicate gas leak. To stop leak, tighten pipe connections. After piping connections are checked, see OPERATION section below. Once heater is operating and main burner is on: paint pipe joints (including flanges), pilot gas tubing connections and control inlet and outlet with rich soap and water solution. Bubbles indicate gas leak. To stop leak, tighten flange screws, joints and pipe connections. Replace part if leak can't be stopped.

DISCONNECT THE APPLIANCE AND ITS INDIVIDUAL SHUT OFF VALVE FROM THE GAS SUPPLY PIPING SYSTEM DURING ANY SUPPLY PRESSURE TESTING EXCEEDING 1/2 PSI (3.5 kPa). GAS SUPPLY LINE MUST BE CAPPED WHEN DISCONNECTED FROM THE HEATER. FOR TEST PRESSURES AT 1/2 PSI (3.5 kPa) OR LESS, THE APPLIANCE NEED NOT BE DISCONNECTED, BUT MUST BE ISOLATED FROM THE SUPPLY PRESSURE TEST BY CLOSING THE MAIN MANUAL GAS VALVE.

BEFORE PLACING THE HEATER IN OPERATION, CHECK FOR GAS LEAKAGE. USE SOAP AND WATER SOLUTION OR OTHER MATERIAL ACCEPTABLE FOR THIS PURPOSE. DO NOT USE MATCHES CANDLES, FLAME OR OTHER SOURCES OF IGNITION TO LOCATE GAS LEAKS.

OPERATION

WARNING

DO NOT ATTEMPT TO OPERATE WATER HEATER WITH COLD WATER INLET VALVE CLOSED.

NEVER OPERATE THE HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE HEATER.

TO OPERATE THE HEATER

1. Close the heater drain valve (Figure 1-T) by turning handle clockwise ↷.
2. Open a nearby hot water faucet to permit the air in the system to escape.
3. Fully open the cold water inlet pipe valve (Figure 1-M) allowing the heater and piping to be filled.
4. Close the hot water faucet as water starts to flow.
5. The heater is ready to be operated.

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FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FLAMMABLE

BEFORE OPERATING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner.

DO NOT TRY TO LIGHT THE BURNER BY HAND.

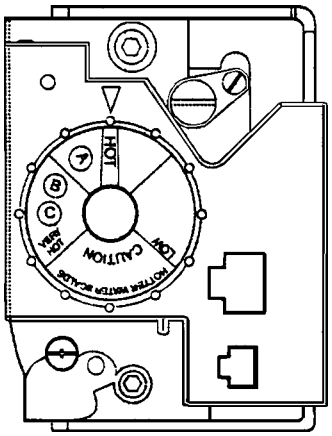
B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS:
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. The heater must be replaced.

OPERATING INSTRUCTIONS



1. STOP! Read the safety information above on this label.
2. Turn the "ON/OFF" switch on the blower control box to the "OFF" position.
3. Set the thermostat to the lowest setting. Turn thermostat dial fully counterclockwise until it stops.
4. This appliance is equipped with a device which automatically lights the burner.
   DO NOT TRY TO LIGHT THE BURNER BY HAND.
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label.
   If you don't smell gas, go to the next step.
6. Set thermostat to desired setting.
7. Turn on all electrical power to the appliance.
8. If the appliance will not operate, follow the instructions "TO TURN OFF GAS TO APPLIANCE" and call your technician or gas supplier.
9. WATER TEMPERATURE ADJUSTMENT
   Turn temperature knob by hand to the desired temperature.
   Hot is approximately 120°F.

CAUTION: Hotter water increases the risk of scald injury. Consult the instruction manual before changing temperatures.

WARNING: TURN OFF ALL ELECTRIC POWER BEFORE SERVICING

TO TURN OFF GAS TO APPLIANCE

A. Set thermostat to the lowest setting.
B. Turn off all the electric power to the appliance if service is to be performed.

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PURGING

Gas line purging is required with new piping or systems in which air has entered.

CAUTION

PURGING SHOULD BE PERFORMED BY PERSONS EXPERIENCED IN THIS TYPE OF GAS SERVICE. TO AVOID RISK OF FIRE OR EXPLOSION, PURGE DISCHARGE MUST NOT ENTER CONFINED AREAS OR SPACES WHERE IGNITION CAN OCCUR. THE AREA MUST BE WELL VENTILATED AND ALL SOURCES OF IGNITION MUST BE INACTIVATED OR REMOVED.

CAUTION

THE "ON/OFF" SWITCH ON THE CONTROL BOX SHOULD NOT BE TURNED TO THE "OFF" POSITION UNLESS THE UNIT IS BEING SERVICED.

TEMPERATURE REGULATION

DANGER

THIS WATER HEATER IS EQUIPPED WITH AN ADJUSTABLE THERMOSTAT TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES REQUIRED FOR AUTOMATIC DISHWASHING AND LAUNDRY USE CAN CAUSE PAINFUL SCALDING WITH POSSIBLE SERIOUS AND PERMANENT INJURY. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND THE TIME OF THE EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, AGED OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE A HOT WATER TAP, OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

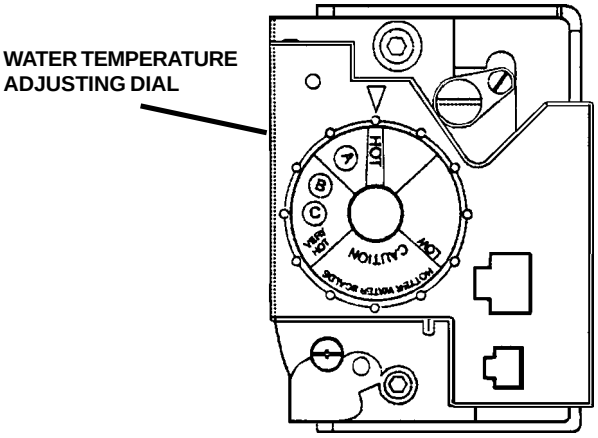
THE WATER HEATER SHOULD BE LOCATED IN AN AREA WHERE THE GENERAL PUBLIC DOES NOT HAVE ACCESS. IF A SUITABLE AREA IS NOT AVAILABLE, A COVER SHOULD BE INSTALLED OVER THE THERMOSTAT TO PREVENT TAMPERING. Suitable covers are available through A.O. Smith Water Products Company, 5621 W. 115th Street, Alsip, IL 60803.

It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature dial be set for the lowest temperature that satisfies your hot water needs. This will also provide the most energy efficient operation of the water heater. The water temperature adjusting dial was factory set at the lowest temperature; all the way counterclockwise to the mechanical stop. Turning the dial counterclockwise ↶ decreases temperature and clockwise ↷ increases temperature.

SETTING THE WATER HEATER TEMPERATURE AT 120°F (49°C) (APPROX. "HOT" MARK ON FACE OF THE TEMPERATURE ADJUSTING DIAL) WILL REDUCE THE RISK OF SCALDS. Some states require settings at specific lower temperatures.

Figure 10 shows the approximate water temperatures produced at various thermostat dial settings. Short repeated heating cycles caused by small hot water uses can cause temperatures at the point of use to exceed the thermostat setting by up to 20°F (11°C). If you experience this type of use you should consider using lower temperature settings to reduce scald hazards.

Valves for reducing point of use temperature by mixing cold and hot water are available. Also available are inexpensive devices that attach to faucets to limit hot water temperatures. Contact a licensed plumber or the local plumbing authority.



Temperature Setting	Time to Produce 2nd & 3rd Degree Burns on Adult Skin
VERY HOT = APPROX.180°F (82°C)	Almost Instantaneously
C = APPROX.162°F (72°C)	About 1/2 Second
B = APPROX. 145°F (63°C)	About 3 Seconds
A = APPROX. 130°F (54°C)	More than 30 Seconds
HOT = APPROX.120°F (49°C)	More than 5 Minutes
LOW = approx.80°F (27°C)	No Hazard

FIGURE 10

MAINTENANCE

CAUTION

DISCONNECT FROM ELECTRICAL SUPPLY BEFORE SERVICING UNIT. FOR YOUR SAFETY, WATER HEATER SERVICE SHOULD BE PERFORMED ONLY BY A QUALIFIED SERVICE TECHNICIAN. READ THE GENERAL SAFETY INFORMATION SECTION FIRST.

USERS OF THIS APPLIANCE SHOULD BE AWARE THAT GAS COMPONENTS WEAR OUT OVER A PERIOD OF TIME. THE GAS CARRYING COMPONENTS OF THIS APPLIANCE SHOULD BE INSPECTED FOR PROPER OPERATION PERIODICALLY BY A QUALIFIED SERVICE TECHNICIAN.

MAIN BURNER

Check main burner every 12 months for proper flame characteristics. This is done by removing door(s) on heater. The main burner should provide complete combustion of gas; ignite rapidly; give reasonable quiet operation; cause no excessive flame lifting from burner ports. Make sure that the flow of combustion and ventilation air is not blocked.

If proper flame characteristics are not evident, check for accumulation of lint or other foreign material that restricts or blocks the air openings in the heater or burner. Also check AIR REQUIREMENTS.

WARNING

SOOT BUILD-UP INDICATES A PROBLEM THAT REQUIRES CORRECTION BEFORE FURTHER USE. Consult with a qualified service technician.

Should the main burner or burner air openings require cleaning, turn the control switch to “OFF” position and allow the burner to cool. Remove the burner and clean with a soft brush. Clean main burner orifice with a suitable soft material.

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HIGH TEMPERATURE CUT-OFF SWITCH

The thermostat has a built-in temperature cut-off switch (TCO), which will shut off gas to the burner in case of excessive water temperature. If the TCO functions the valve will flash 4 times and the valve must be replaced. It is important that a serviceman be called to determine the reason for limit operation and thus avoid repeated thermostat resetting. Lower the temperature adjustment dial setting on control.

VENTING SYSTEM

HAVE VENTING SYSTEM CHECKED EVERY SIX MONTHS FOR OBSTRUCTIONS AND/OR DETERIORATION IN VENT PIPING.

A. Insofar as is practical, close all doors, windows and air inlets to the building. Turn on all exhaust fans (range hood, bathroom exhaust, etc.) so they will operate at their maximum speed. Close fireplace dampers.

B. Turn water temperature adjusting knob to full, counterclockwise and open water faucet if necessary to keep burner in operation.

C. "CHECKING THE DRAFT." Operate the water heater for several minutes and check to see if it is venting properly by passing a lit match or paper near the opening of the Air Supply Box. If the draft is proper, the match flame will be drawn into the Air Supply Box (fig 11). If not, the combustion products will tend to extinguish the flame. If an improper draft exists, do not operate the water heater until proper adjustments or repairs are made to provide adequate draft through the gas vent.

D. Next, turn on all other fuel burning appliances within the same room so they will operate at their full input.

Repeat step C above.

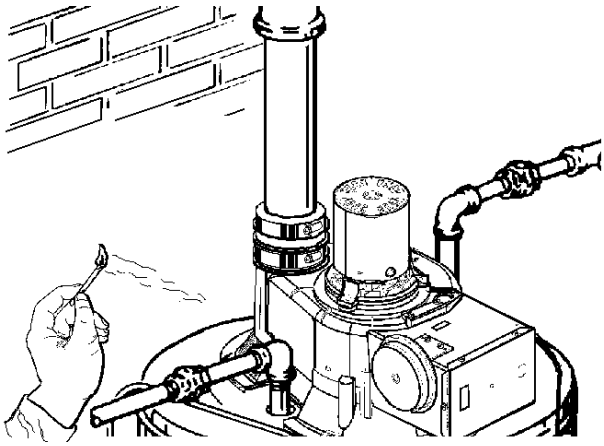

FIGURE 11

POWER VENTER MAINTENANCE

The BTF-75 must be inspected quarterly. Points of inspection are:

1. MOTOR - Motor must rotate freely. This is a sealed motor and no oiling is required.

2. WHEEL - Wheel must be clean of soot, ash or any other coating which inhibits either rotation or air flow. Remove all foreign material from vent system before operating.

3. AIR SUPPLY BOX-Every month check operation and make sure nothing is blocking dilution air entrance.

4. The pressure switch part inside the power venter must be open and free from deposits of soot, carbon, etc.

For safety and satisfactory operation it is recommended that the heater be checked once a year by a competent service person.

T & P VALVE

At least once a year, the temperature and pressure relief valve must be checked to ensure that it is in operating condition. Lift the lever at the top of the valve several times until the valve seats properly and operates freely.

WARNING

THE WATER PASSING OUT OF THE VALVE DURING THIS CHECKING OPERATION MAY BE EXTREMELY HOT. AVOID CONTACT AND DISCHARGE SAFELY TO PREVENT WATER DAMAGE.

DRAINING

Periodically open the drain valve and allow the water to run until it flows clean. This will help prevent sediment build-up in the tank.

It is normal for lime and scale deposits to form within the tank and on the heat exchanger surfaces. Such deposits will not be removed by periodic draining. It is necessary to chemically delime the affected parts in water areas where such deposits are encountered. Contact your dealer or plumber for deliming information.

If the heater is to be shut off and exposed to freezing temperatures, it must be drained. Water, if left in the tank and allowed to freeze, will damage the heater.

- Turn off the gas and cold water inlet valve to the heater.
- Open a nearby hot water faucet and the heater drain valve.
- BE CAREFUL TO GRASP THE DRAIN VALVE HANDLE SO THAT THE HAND IS NOT EXPOSED TO HOT WATER. IF DESIRED, A HOSE MAY BE CONNECTED TO THE DRAIN VALVE TO CARRY THE WATER AWAY.

WARNING: The water CAN BE HOT.

The drain valve must be left open during the shutdown period.

• To restart heater, refer to the instructions under OPERATION.

MAIN BURNER AND IGNITER

Check main burner (figure 12) at least every 6 months for proper flame characteristics. The main burner should display the following characteristics:

1. Provide complete combustion of gas.
2. Cause rapid ignition and carryover of flame across entire burner.
3. Give reasonably quiet operation during ignition, burning and extinction.
4. Cause no excessive lifting of flames from burner ports.

If preceding burner characteristics are not evident, check for accumulation of lint or other foreign material that restricts or blocks the air openings to the heater or burner.

WARNING

SOOT BUILD-UP INDICATES A PROBLEM THAT REQUIRES CORRECTION BEFORE FURTHER USE. CONSULT WITH A QUALIFIED SERVICE TECHNICIAN.

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Should the main burner or burner air openings require cleaning, remove the burner and clean with a soft brush. Clean main burner orifice with a suitable soft material.

CHECK FOR GOOD FLOW OF COMBUSTION AND VENTILATING AIR TO THE UNIT. MAINTAIN A CLEAR OPEN AREA AROUND THE HEATER AT ALL TIMES. DO NOT STORE COMBUSTIBLES OR FLAMMABLE LIQUIDS NEAR OR AROUND AN APPLIANCE.

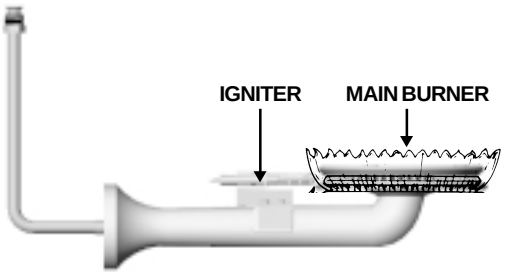

FIGURE 12 - MAIN BURNER AND IGNITER ASSEMBLY

CONDENSATION

Water vapor can condense on the cooler surfaces of the tank forming droplets, these drip into the fire or run out on the floor. This is common at the time of startup after installation, during periods of time when incoming water is very cold, or the heater may be undersized for the requirements.

Droplets from the bottom of the flue may be due to corrosive combustion products or improper vent. Check with your dealer for more information.

CATHODIC PROTECTION-ANODE

The anode rod within the tank is designed to be slowly consumed cathodically, minimizing corrosion in the glass lined tank. A hydrogen sulfide (rotten egg) odor may result if water contains high sulfate and/or minerals. Chlorinating the water supply should minimize the problem. (See EXTENDED NON-USE PERIODS).

NOTE: Anode must remain installed (except for inspection) to avoid shortening tank life. See LIMITED WARRANTY. Replace as necessary.

SERVICE AND REPAIR

The A.O. Smith water heater requires no special care other than the normal maintenance as noted above. If you are having a problem with your water heater, before calling for service please refer to the following TROUBLESHOOTING sections. If service becomes necessary, contact your dealer, installer or an authorized service agent. Do not attempt to repair the water heater yourself. Any work performed by unauthorized personnel may void the warranty.

If you are having a problem with your A.O. Smith water heater and are not pleased with the service you received:

- First, please contact your dealer or the A.O. Smith authorized service agent in your area and explain to them why you are not satisfied. This will usually correct the problem.
- If after working with your dealer or service agent the problem has not been resolved to your satisfaction, please let us know by either writing to us at:

A.O. Smith Water Products Company
Service Department
600 East John Carpenter Freeway
Rochelle Park, Suite 200
Irving, TX 75038

or, going to our website at: **www.hotwater.com**
Please click on: "Mail",
then click on: "Service"
and leave us a message.

Please be sure to provide the following information when writing or e-mailing:

- Model Number
- Serial Number
- Date of Original Purchase
- Date Problem Originated
- Explanation of Problem

Also, please be sure to include a daytime telephone number.

TROUBLE SHOOTING

Water heater may exhibit problems that are unrelated to a malfunction of the water heater itself. The following information and tables may serve to answer your question about a problem that you are having without having to call a service agent.

For your safety, water heater service should be performed only by a qualified service technician. Read the GENERAL SAFETY INFORMATION section first.

WATER HEATING CYCLE

(GAS AND ELECTRIC POWER ARE ON, "OFF/ON" SWITCH IS ON)

1) SMARTVALVE® (1) CALLS FOR HEAT (SEE FIGURES 7 &12)

   A) THERMOSTAT SENSES NEED FOR HEATING WATER

   B) CONTACTS CLOSE IN THERMOSTAT, POWER (115 VAC) FLOWS TO BLOWER MOTOR

2) BLOWER MOTOR ROTATES BLOWER WHEEL

   A) BLOWER WHEEL SPEED INCREASES

   B) WHEEL SPEED INCREASES, AIR PRESSURE SWITCH CONTACTS CLOSE

3) 120 VAC FLOWS TO HOT SURFACE IGNITER

NOTE: THE CONTROL MODULE ON THIS UNIT WILL TRY A MAXIMUM OF THREE TIMES TO LIGHT THE UNIT. CYCLE CAN BE RESTARTED AT ANY TIME BY TURNING OFF SWITCH AND THEN TURNING BACK ON. IF UNIT HAS GONE THROUGH THREE CYCLES AND DID NOT LIGHT, THEN REPAIRMAN SHOULD BE CALLED TO CHECK OPERATION OF HEATER.

4) MAIN BURNER IGNITES

   A) GAS FLOWS TO MAIN BURNER PORTS AND IS IGNITED

5) GAS VALVE SENSES BURNER FLAME

6) BURNER HEATS WATER

   A) BURNER HEATS WATER TO THERMOSTAT SETTING

   B) CONTACTS IN THERMOSTAT OPEN,

   C) CYCLE IS COMPLETED

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WARNING: DO NOT BY-PASS ANY CONTROLS TO MAKE HEATER OPERATE. OPERATE ONLY AS WIRED FROM FACTORY.

TROUBLESHOOTING

For your safety, water heater service should be performed only by a qualified service technician.
Read the GENERAL SAFETY INFORMATION section first.

PROBLEM	POSSIBLE MALFUNCTION	SERVICE TO BE PERFORMED
NOT ENOUGH OR NO HOT WATER	1) Blower will not run	
	A) "ON/OFF" control switch turned off	Turn switch to the "ON" position.
	B) Blower unplugged	Plug blower back into 115 vac. outlet.
	C) No power at outlet	Repair service to outlet.
	D) "ON/OFF" switch defective	Replace switch.
	E) Control harness defective	Replace control harness.
	F) Blower motor defective	Replace blower and motor.
	2) Blower running, burner not on	Replace switch.
	A) Fan not running fast enough to close air switch contacts	Check for low voltage, less than 102 vac., have service checked and repaired.
		If voltage is above 102 vac., make sure there is not more than 30 Equivalent feet of 3 inch pipe or 85 equivalent feet of 4 inch pipe installed or vent terminal blockage.
		If at least 102 vac., less than 30 equivalent feet of 3 inch pipe or 85 equivalent feet of 4 inch pipe and not terminal blockage, replace blower.
	B) Air pressure switch defective	Replace switch.
	C) Gas valve defective	Replace gas valve.
	D) Control harness defective	Replace harness.
	E) Igniter defective	Replace igniter.
	F) Unit has completed three trials to light and failed	Reset cycle by turning switch off and then back on. If unit does not light in three trials, call an authorized A.O. Smith service representative.
	G) Discharge air limit tripped	Verify dilution air openings are free of obstructions.
		Make sure there is no more than 30 equivalent feet of 3 inch pipe or 85 equivalent feet of 4 inch pipe.
		Check for low voltage, less than 102 vac., have service checked and repaired.
		Make sure vent terminal is not blocked.
	3) Thermostat problems	
	A) Thermostat set too low	Turn temperature control higher.
	B) Thermostat or ECO defective	Replace thermostat.
	C) High limit control circuit open	Replace.
	4) Others	
	A) Heater undersized	Reduce hot water use.
	B) Low gas pressure	Contact an authorized A.O. Smith service representative.
	C) Incoming water is unusually cold	Allow more time for heater to re-heat.
	D) Leaking hot water pipes or fixtures	Have plumber check and repair leaks.
VENT PIPE TOO HOT (ABOVE 170° F)	A) Blower does not run when heater fired	Take unit out of service immediately, call an authorized A.O. Smith service representative.
	B) Not enough dilution air to mix with flue gases in "Tee"	Proper air circulation must be provided for combustion and dilution of flue temp. Refer to "INSTALLATION" section.
	C) Air in room too hot for mixing with flue gases	Room air to be used for dilution with combustion products in flue should be less than 90°F.
	D) Wrong burner orifice	Install correct orifice.
YELLOW FLAME	A) Dirt in burner ports	Turn off heater and gas, clean burner head.
	B) Combustion air path restricted	Clear area around heater and check under heater, remove any debris under heater and in openings in bottom cover.
	C) Not enough room air for proper combustion	Refer to installation manual - Confined and Unconfined Space statements on page 4 and 5 for required openings.
CONDENSATION	A) Water on the floor under heater	See "CONDENSATION."
	B) Water dripping from fan	Provide drip "TEE" to catch condensation, refer to pages 8 and 10.
WATER LEAKS	Improperly sealed, hot or cold supply connections, relief valve, drain valve or thermostat threads	Turn off heater & water, repair unit.
	Leakage from other appliances or water lines	Inspect other appliances near water heater.
	Condensation of flue products	Refer to "CONDENSATION."
LEAKING T&P VALVE	Thermal expansion in closed water system	Install thermal expansion tank (DO NOT plug T&P valve).
	Improperly seated valve	Check relief valve for proper operation (DO NOT plug T&P valve).
HOT WATER ODORS OR COLOR (Refer to CATHODIC PROTECTION)	High sulfate or mineral content in water supply or iron or sulfate reducing bacteria in water supply	Drain and flush heater thoroughly, chlorinate, refill and flush again then chlorinate water supply.

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TROUBLESHOOTING WITH THE LED

LED STATUS	INDICATES	CHECK/REPAIR
OFF	No power to system control.	1. Appliance On/Off switch in the Off position. 2. Line voltage input power at L1 and L2 connectors. 3. System wiring harness in good condition and securely connected at both ends.
BRITE - DM	Normal Operation This indication shows whenever the system is powered, unless some abnormal event has occurred.	Not Applicable.
1 FLASH	Setpoint error, internal failure detected.	1. Replace control.
2 FLASHES	Airflow proving switch remains open longer than 30 seconds after a call for heat begins. Combustion air blower is not energized until airflow proving switch opens.	1. Airflow proving switch stuck closed. 2. Airflow proving switch mis-wired or jumpered. **WARNING** **Line Voltage Hazard.** **Can cause property damage, severe injury or death.** Turn off appliance before coming in contact with pressure switch and/or electrical connections.
3 FLASHES	Airflow proving switch remains open longer than 30 seconds after combustion air blower energized. System goes into 5 minute delay period, with combustion air blower off. At the end of the 5 minute delay, another ignition cycle will begin.	1. Airflow proving switch operation, tubing and wiring. 2. Obstructions or restrictions in appliance air intake or exhaust flue system that prevent proper combustion air flow. **WARNING** **Line Voltage Hazard.** **Can cause property damage, severe injury or death.** Turn off appliance before coming in contact with pressure switch and/or electrical connections.
4 FLASHES	Thermal Cutoff open. Combustion air blower is energized. Internal hardware failure.	1. Replace Control.
5 FLASHES	Flame signal sensed out of proper sequence. Combustion air blower is energized.	1. Flame at main burner. 2. Replace control.
6 FLASHES	System Lockout. After 1 hour lockout reset delay, control will reset and initiate a new ignition sequence if the call for heat is still present.	1. Gas supply off or at too low pressure to operate. 2. Damaged or broken HSI element. 3. Appliance not properly earth grounded. 4. Flame sense rod contaminated or in incorrect location. 5. HSI element located incorrect position. 6. HSI element or flame sense rod wiring in good condition and properly connected. 7. Less than 100 Vac between flame rod and burner pan with 120 Vac input to control. 8. Cycle external power or remove request for heat for 2 seconds and reapply.

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SV9560/SV9570 SMARTVALVE® WATER HEATER CONTROL
TROUBLESHOOTING GUIDE

START

NOTE: BEFORE TROUBLESHOOTING BECOME FAMILIAR WITH THE STARTUP AND CHECKOUT PROCEDURE.

I

1

CHECK FOR PROPER VOLTAGE AT CONTROL HARNESS (SEE INSET A). VOLTAGE SHOULD BE 120V BETWEEN 120V COMMON AND 120V HOT.

NO

CHECK:
- LINE VOLTAGE POWER
- WIRING

WARNING

Line Voltage Hazard.
Can cause property damage, severe injury or death.

Only a trained, experienced service technician should perform this trouble-shooting. Be certain to avoid contact with pressure switch and/or electrical connections.

YES

TURN ON GAS SUPPLY PLUG HARNESS INTO SmartValve® CONTROL. INITIATE A REQUEST FOR HEAT. COMBUSTION BLOWER SHOULD BE ON AND PREPURGED.

NO

CHECK:
- IS AIR PROOFING SWITCH STUCK OR CLOSED.
- IS THE FLUE BLOCKED.
- IS THE WIRING CONNECTED PROPERLY TO THE SWITCH AND COMBUSTION BLOWER.

IGNITER WARMS UP AND GLOWS RED.

NO

WITH IGNITER CABLE CONNECTED, MEASURE VOLTAGE AT HSI ELEMENT OUTPUT (SEE INSET B) 120V NOMINAL CHECK DAMAGED OR BROKEN HSI ELEMENT.

WARNING

Line Voltage Hazard.
Can cause property damage, severe injury or death.

Only a trained, experienced service technician should perform this trouble-shooting. Be certain to avoid contact with pressure switch and/or electrical connections.

NO → REPLACE SmartValve® CONTROL

YES

1

REPLACE HSI

MAIN VALVE OPENS AND MAIN BURNER LIGHTS.

NO

CHECK:
- IS THE APPLIANCE EARTH GROUNDED (120V BETWEEN HOT AND CHASSIS GROUND).
- IS GAS SUPPLY OFF OR TOO LOW PRESSURE TO OPERATE THE CONTROL.
- DOES BURNER FLAME MAKE GOOD CONTACT WITH THE FLAME ROD.
- IS FLAME SENSE ROD CONTAMINATED OR IN AN INCORRECT LOCATION.
- IS THERE APPROXIMATELY 100 VAV BETWEEN FLAME ROD AND BURNER PAN WITH 120VAC INPUT TO CONTROL.
- IF ALL OF THE ABOVE ARE GOOD, REPLACE IGNITER AND FLAME ROD ASSEMBLY.

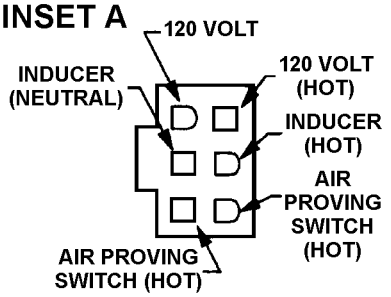
SYSTEM IS OKAY.

CYCLE THERMOSTAT OFF AND BACK ON

MAIN BURNER LIGHTS

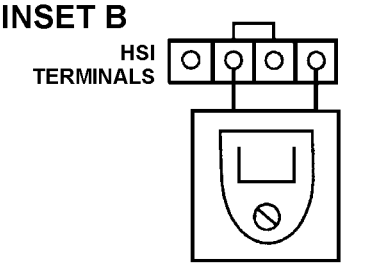
NO → REPLACE SmartValve® CONTROL

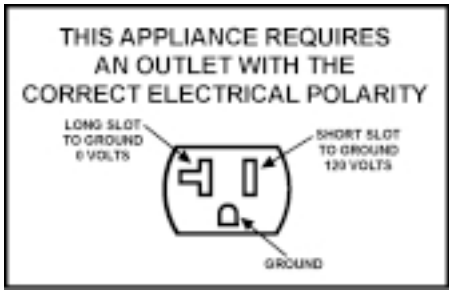
INSET A



CHECK FOR DAMAGED OR MISSING TERMINALS IN CONNECTOR

INSET B




THIS APPLIANCE REQUIRES AN OUTLET WITH THE CORRECT ELECTRICAL POLARITY
LONG SLOT TO GROUND 0 VOLTS
SHORT SLOT TO GROUND 120 VOLTS
GROUND

1 **WHEN MEASURING VOLTAGE AT CONNECTIONS, USE CARE TO ASSURE TERMINALS ARE NOT DAMAGED.**

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Model BTF-75 Limited Warranty

A. O. Smith Corporation, the warrantor, extends the following LIMITED WARRANTY to the owner of this water heater.

1. **THE TANK**
   If the glass-lined tank in this water heater shall prove upon examination by the warrantor to have leaked due to natural corrosion from potable water therein, during the first THREE years after initial installation, the warrantor will supply a complete new A. O. Smith water heater of equivalent size and current model. Some government agencies are requiring energy efficient standards for water heaters. In the event regulations prohibit sale of a model of equivalent size and construction, A. O. Smith will provide a model which complies with the regulations of your area, in which case the consumer will be charged the difference in price between the like replacement and the energy efficient model required. The warranty on the replacement water heater will be limited to the unexpired term of the original warranty.

2. **ALL OTHER PARTS**
   If within ONE year after initial installation of this water heater, any part or portion shall prove upon examination by the warrantor to be defective in material or workmanship, the warrantor will repair or replace such part or portion at its option.

3. **CONDITIONS AND EXCEPTIONS**
   This warranty shall apply only when the water heater is installed in accordance with local plumbing and building codes, ordinances and regulations, the printed instructions provided with it and good industry practices. In addition, a temperature and pressure relief valve, certified by and officially sanctioned and recognized independent testing agency and approved by the American Society of Mechanical Engineers, must have been installed.
   a. This warranty shall apply only when the heater is used:
      (1) at temperatures not exceeding the maximum setting of the thermostat;
      (2) at water pressure not exceeding the working pressure shown on the heater;
      (3) when filled with potable water free to circulate at all times;
      (4) in a non-corrosive and non-contaminated atmosphere;
      (5) with factory approved anode(s) installed;
      (6) in it's original installation location;
      (7) in the United States, its territories or possessions, and Canada.
   b. Any accident to the water heater, any misuse, abuse (including freezing or thermal expansion damage) or alteration of, any operation in a modified form, or any attempt to repair tank leaks will void this warranty.
   c. This warranty is void if a device acting as a backflow prevention device (check valves etc.) is installed in the cold water supply the heater is connected to, unless an effective method of controlling thermal expansion is also installed at the heater(s) and operational at all times. The relief valve installed on the heater is not an acceptable method.

4. **SERVICE AND REPAIR EXPENSES**
   Under the limited warranty the warrantor will provide only a replacement water heater or part thereof. The owner is responsible for all other costs. Such costs may include but are not limited to:
   a. Labor charges for service removal, repair or reinstallation of the water heater or any component part;
   b. Shipping, delivery, handling, and administrative charges for forwarding the new heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor.
   c. All cost necessary or incidental for any material and/or permits required for installation of the replacement heater or part.

5. **LIMITATIONS ON IMPLIED WARRANTIES**
   Implied warranties, including the warranty of merchantability imposed on the sale of this heater under state law are limited to one (1) year duration for the heater or any of its parts. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

6. **CLAIM PROCEDURE**
   Any claim under the warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practicable, the owner should contact:

U.S. Customers	Canadian Customers
A. O. Smith Water Products Company	A. O. Smith Enterprises Ltd.
5621 West 115th Street	P. O. Box, 310 - 768 Erie Street
Alsip, IL 60803	Stratford, Ontario N5A 6T3
Telephone: (800) 323-2636	Telephone: (519) 271-5800

   a. The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.
   b. Dealer replacements are made subject to in-warranty validation by warrantor.

7. **DISCLAIMERS**
   NO OTHER EXPRESS WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE HEATER. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT.
   a. Some states do not allow the exclusion or limitation of the incidental or consequential damage, so the above limitations or exclusions may not apply to you.
   b. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Fill in the following for your own reference. Keep it. Registration is not a condition of warranty. The model and serial number are found on the heater's rating plate.

Model No. _____ Serial No. _____ Date Installed _____

Dealer's Name _____

Dealer's Address _____ Phone No. _____

City and State _____ Zip _____

KEEP THIS WARRANTY POSTED ADJACENT TO THE HEATER FOR FUTURE REFERENCE.

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